REMARKS

I. Formal Matters. Subsequent to entry of the foregoing amendments, claims 1, 2, 4, 8, 11, 12, 14 and 18 are currently pending in this application. Claims 3, 5-7, 9, 10, 13, 15-17, 19 and 20 are cancelled. Applicant thanks the Examiner for acknowledging the claim to priority under 35 U.S.C. §119 and for confirming receipt of a certified copy of the priority document. Applicant also thanks the Examiner for returning initialled Forms PTO/SB/08 A&B to the office of the undersigned to signify his consideration of the references submitted via the Information Disclosure Statements filed on December 27, 2001; February 23, 2004; and July 14, 2004.

II. Claims. The Examiner rejects claims 1-3, 5-13 and 15-20 as allegedly being anticipated by *Maruta et al.* (U.S. Patent No. 6,792,033) ("*Maruta*") under 35 U.S.C. §102(e). Applicant respectfully traverses this rejection in view of the following remarks.

Claims 1 and 11. *Maruta* discloses an adaptive array antenna receiving apparatus, wherein antenna elements are "linearly laid out on each sector" of a polygon (Fig. 3; col. 6, lines 11-12), and weighting synthesis (Fig. 4, ref. 16) is done between sectors (col. 5, lines 46-52). Further, *Maruta* discloses an LMS algorithm as an update algorithm providing antenna weight updates in column vectors (as opposed to a 2 dimensional matrix). If the adaptive array in *Maruta* were extended to adapt to a multipath (fingers), then the error signal used in the adaptive update algorithm would be an individual error signal, where each individual error signal is

produced in each sector, e_k (Figs. 3 and 4; col. 5, lines 38-41). *Maruta* discloses antenna weighting coefficients irrespective of or in the absence of correlation between fingers.

In contrast, the Applicant claims, "...combining the weighted signals to produce a rake combined signal..." and "an error producing means...to produce a common error signal..." (claims 1 and 11, ; paragraph [0024], $e_k(m)$). *Maruta* fails to disclose an error producing means to produce a common error signal (col. 5, lines 45-67). Further in contrast to *Maruta*, Applicant additionally claims a control means receiving a common error signal (claims 1 and 11). At least for failing to disclose the element of an error producing means to produce a common error signal and a control means to receive said common error signal, Applicant asserts that the rejection of claims 1 and 11 as allegedly being anticipated by *Maruta* under 35 U.S.C. §102(e) is improper and should be withdrawn.

Further, *Maruta* discloses weighting synthesis (Fig. 4, ref. 16) done between sectors (col. 5, lines 46-52). In addition, *Maruta* discloses an LMS algorithm as an update algorithm providing antenna weight updates in *column vectors.* If the adaptive array in *Maruta* were extended to adapt to a multipath (fingers), then the error signal used in the adaptive update algorithm would be an individual error signal, and antenna weighting coefficients would be determined irrespective of or in the absence of correlation between fingers, in the absence of a two-dimensional, N-order, matrix.

In contrast, claims 1 and 11 require the subject matter of ...wherein each of said antenna weight control means controls the weighting factors for each of weighting factor multiplying means by the use of an N-order (N being an integer not smaller than 2) correlation matrix in case where said antenna elements are N in number (claims 1 and 11). At least for failing to claim weighting factors determined by the use of an N-order ($N \geq 2$) matrix, the alleged anticipation rejection of claims 5, 15, 9 and 19 by *Maruta* under 35 U.S.C. §102(e) is improper and should be withdrawn.

Claims 2 and 12. The Examiner asserts that *Maruta* teaches that each control means uses an MMSE algorithm that is equivalent to RLS, where the Examiner references col. 5, lines 46-55 (OA page 3). *Maruta* discloses an "LMS" algorithm (col. 5, lines 50-55).

In contrast, Applicant claims a control means that uses an RLS algorithm (claims 2 and 12). One ordinarily skilled in the art readily recognizes the many differences between a Recursive Least Squares algorithm and a Least Mean Square algorithm. For example, the structural differences in the LMS and RLS weights updates are shown to produce regions where the LMS performance exceeds that of the RLS and *vice versa*.[1] The LMS algorithm is the most commonly used adaptive algorithm because of its simplicity and reasonable performance. Since it is an

[1] Wei, P., Han, P. Zeidler, J. and Ku, W. *Comparative Tracking Performance of the LMS and RLS Algorithms for Chirped Narrowband Signal Recovery.* IEEE TRANSACTIONS ON SIGNAL PROCESSING, VOL. 50, NO. 7, JULY 2002, p. 1602. http://zeidler.ucsd.edu/pubs/J46.pdf.

iterative algorithm, it can be used in a highly time-varying signal environment. It has a stable and robust performance against different signal conditions. However, it may not have a really fast convergence speed compared to other more complicated algorithms like the Recursive Least Square (RLS).[2] The RLS algorithm (like the update algorithm in claims 1 and 11) must consider the correlation between fingers, and the correlation matrix (*Application* paragraph [0021]), whereas the LMS algorithm employs a one-dimensional vector. Neither in the text cited by the Examiner, nor in the text at large, does *Maruta* disclose an RLS algorithm. At least for failing to disclose the element of a control means that uses an RLS algorithm, Applicant asserts that the rejection of claims 2 and 12 as allegedly being anticipated by *Maruta* under 35 U.S.C. §102(e) is improper and should be withdrawn.

The Examiner rejects claims 4 and 14 as allegedly being obvious over *Maruta* in view of *Tsutsui* (U.S. Patent No. 6,385,181) under 35 U.S.C. §103(a). Applicant relies on the dependency of claims 4 and 14 on allowable respective independent claims 1 and 11 to assert the allowability of claims 4 and 14. However, the following remarks address the disclosure in *Tsutsui* with respect to independent claims 1 and 11.

The arguments presented for traversal of claim 1 describe the failure of *Maruta*, the primary reference, to disclose the elements of independent claims 1 and 11, upon which claims 4 and 14 depend, respectively. Addressing the secondary reference, *Tsutsui* discloses "a single

[2] http://etd.lib.fsu.edu/theses/available/etd-04092004-143712/unrestricted/Ch_6lms.pdf at p 64.

adaptive controller 41...provided for all paths and determines antenna weights of all selected beams of all paths" (col. 15, lines 53-58; Fig. 15). A common error signal is produced by use of the rake combined signal and the single adaptive controller controls all paths. The disclosure in *Tsutsui* is equivalent to the disclosure in Applicant's Fig. 1, Background of the Invention.

In contrast, Applicant claims, antenna weight control means supplied with despread signals and the common error signal" (claim 1). Neither individually nor in combination do *Maruta* and *Tsutsui* disclose the elements of claims 1 and 11, control means supplied with despread signals and the common error signal.

Dependent claims 8, and 18 are asserted as being in condition for allowance at least for depending from an allowable independent claim.

In view of the preceding amendments and remarks, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue that the Examiner feels may be best resolved through a personal or telephonic interview, he is kindly requested to contact the undersigned at the local telephone number listed below.

The USPTO is directed and authorized to charge all required fees (except the Issue/Publication Fees) to our Deposit Account No. 19-4880. Please also credit any over-payments to said Deposit Account.

Respectfully submitted,

Amelia F. Morani, Ph.D.
Registration No. 52,049

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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